

## METHOD AND APPARATUS FOR DISTRIBUTING INDEXED SPECIFIC ELECTRONIC INFORMATION USING UNIQUE INDEX CODES

### CROSS-REFERENCE TO RELATED APPLICATIONS

**[0001]** The present application is related to Australian Provisional Application Nos. 2003906195 and 2003906196, both filed on November 11, 2003 and to Australian Provisional Application No. 2003906529, filed on November 26, 2003. These applications, in their entirety, are herein incorporated by reference.

### BACKGROUND OF THE INVENTION

#### Field of the Invention

**[0002]** The present invention relates generally to electronic information distribution via electronic information networks using unique index codes. More particularly, the present invention relates to facilitating the distribution of specific electronic information between end users and their clients by enabling this distribution to occur by only requiring the passing of an associated unique index code directly from the end user to their client.

#### Description of Related Art

**[0003]** Computer technology is continuously advancing, providing the facility to pass large amounts of specific electronic information between people. Nevertheless, the passage of specific electronic information between individuals in a business environment is still often facilitated through hard-copy media, such as brochures or business cards. The need exists for easy transfer of specific electronic information received in hard-copy media into electronic media for use within computers.

### BRIEF SUMMARY OF THE INVENTION

**[0004]** A method and apparatus for using unique index codes to index specific electronic information and facilitating the retrieval of such indexed specific electronic information over distributed electronic information networks is described herein. Unique index codes for a given category of specific electronic information, such as business cards or product brochures, are generated and passed to a central index code management system. One or more of these unique index codes is allocated to an end user who can then associate this code with specific electronic information such that a database is created by

the end user of unique index codes with associated specific electronic information. In one embodiment the end user will then make this database available on an electronic information server within an electronic information network. The location of this electronic information server is then made known to a central index code management system, where a database is maintained of the location of electronic information servers where the databases containing each unique index code can be found. The end user can provide a recipient client with a unique index code that is associated with specific electronic information that the end user wishes to distribute to the recipient client, such as the end user's business card details. The recipient client can then use a client apparatus to facilitate the retrieval of the specific electronic information by the recipient client inputting into the client apparatus the unique index code provided by the end user. The client apparatus can then submit the unique index code to the central index code management system, which can interrogate its database of unique index codes to determine the location of the end user's electronic information server to whom the submitted unique index code was allocated. The specific electronic information associated with the unique index code can then be retrieved by the central index code management system from the database at the end user's electronic information server. The central index code management system can then forward this specific electronic information to the requesting client apparatus via the central index code management system. The recipient client can then make use of the specific electronic information through the client apparatus.

**[0005]** As a further option, at the time when the specific electronic information is being accessed at the end user's electronic information server, the request by the client apparatus for specific electronic information can be logged at the end user's electronic information server and additional information about the recipient client may also be logged at the end user's electronic information server, thereby facilitating monitoring by the end user of how often and to whom the specific electronic information is distributed. It is also possible for the client apparatus to be configured to periodically check for updates to the specific electronic information associated with a unique index code in the client apparatus database using the same process as originally followed for accessing the original version of the specific electronic information.

**[0006]** In one embodiment of the present invention, an end user associates a unique index code to the end user's business card details and stores this information in a database that is accessible by the central index code management system. An end user can

then print this unique index code onto the end user's hard copy business cards. When a recipient client receives such a card, the recipient client can use the client apparatus on a personal computer to retrieve the end user's business card details in electronic format.

[0007] In another embodiment of the present invention, products for sale are associated with unique index codes. Numerous end users could associate unique index codes with each of the products they are vending to customers. The end users could leave brochures or catalogues with customers with the unique index codes printed next to the product descriptions. Customers could use a client apparatus to obtain the product information in an electronic format. The electronic version of the product information could then easily be incorporated into other external apparatuses, such as stock or inventory control systems. Customers could regularly check for updates to this information, such as the product availability or pricing. A customer that regularly purchases large quantities of stationery from numerous suppliers, for example, could use the client apparatus to obtain up-to-the-minute pricing for a standard order of stationery from all of the customer's suppliers.

[0008] An object of the present invention is to enable a recipient of specific electronic information created by another user to have access to an updated version of the electronic information via an electronic information network.

#### BRIEF DESCRIPTION OF THE DRAWINGS

[0009] Additional objects, features, and advantages of the present invention will become apparent from the following detailed description of the embodiments of the invention in conjunction with the accompanying drawings where like reference numerals indicate like features, in which:

[0010] **FIGURE 1A** is a schematic of an example methodology for associating unique index codes with business cards in accordance with an embodiment of the present invention;

[0011] **FIGURE 1B** is a schematic of an example methodology for retrieving business card content using unique index codes in accordance with an embodiment of the present invention;

[0012] **FIGURE 1C** is a schematic of an example methodology for business card content distribution in accordance with an embodiment of the present invention;

[0013] **FIGURE 2** is a schematic of example apparatus elements and interfaces for business card information distribution in accordance with an embodiment of the present invention;

[0014] **FIGURE 3A** is a schematic of an example methodology for associating unique index codes with product information in accordance with an embodiment of the present invention;

[0015] **FIGURE 3B** is a schematic of an example methodology for retrieving product information using unique index codes in accordance with an embodiment of the present invention; and

[0016] **FIGURE 3C** is a schematic of an example methodology for retrieving updates to product information using unique index codes in accordance with an embodiment of the present invention.

#### DETAILED DESCRIPTION OF EMBODIMENTS

[0017] In the following detailed description numerous specific details are set forth in order to provide a thorough understanding of the present invention. However, it will be understood by those skilled in the art that the present invention may be practiced without these specific details. In other instances, well known methods, procedures, components, and apparatuses have not been described in detail so as not to obscure the present invention.

[0018] **FIGURE 1A**, **FIGURE 1B**, and **FIGURE 1C** show an example methodology of one embodiment of the present invention. The methodology represented is for the purpose of passing business card information from an end user to various recipient clients with the intention that by only passing the unique index code associated to the end user's business card the recipient clients can later, through the use of the client apparatus, access the full details of the electronic version of the business card, in accordance with an embodiment of the present invention. This example is one embodiment of the present invention and is explained in detail to enable the fuller description of the present invention by way of example and not limitation of its potential further embodiments. The present invention can be employed for the purposes of distribution of numerous other forms of specific electronic information including by way of example but not limited to product brochures, music recordings, moving and photographic images, curriculum vitae and transcripts.

[0019] Figure 1A shows **100** the creation of a unique index code. In this embodiment the unique index codes are created within the central index code management system, however the codes could also be created by an external apparatus and passed to the central index code management system for distribution to end users. In embodiments, unique index codes are randomly generated alphanumeric strings more than approximately six characters in length, for example "D-F9T-3X5-WR4". A ten-character token serial number format for example will therefore provide for approximately thirty-six times ten to the power of fourteen (the number thirty-six with fourteen zeros following) unique index codes to be generated. The central index code management system creates unique index codes in accordance with an algorithm or method that ensures no two unique index codes are the same and ensures the random dispersal of the unique index codes within the range of all possible permutations of the unique index codes available for the defined format. Various defined formats, such as the syntax of the example of a ten-character unique index code "D-F9T-3X5-WR4", can be established for use in various embodiments of the present invention. The generation of unique index codes at random intervals within a predetermined range ensures that there is a low probability that any two unique index codes will have consecutive nomenclature. The randomness of the unique index code generation and the extraordinarily large number of possible unique index code permutations means that knowing any one unique index code will make it more difficult for a person to guess other unique index codes. Even if over one billion unique index codes had been generated and allocated to end users using a ten-character unique index code format for example, a person guessing unique index code combinations at random would still have less than a one in three million chance of guessing an active unique index code combination. This aspect of the present invention supports the uniqueness, confidentiality and security of the unique index codes.

[0020] Upon generation, these unique index codes are distributed **101** in lots of one or more to end users **102** by the central index code management system. The central index code management system maintains a database of every unique index code that has been generated or allocated. This database of unique index codes also records the location within a network where the end user's electronic information server that will store the electronic business card associated with each unique index code can be found **107**. Numerous instances of the central index code management system and its database can be replicated on other geographically dispersed electronic information servers within the electronic information network such that these copies of the central index code

management system and its database are readily accessible within the network by client apparatuses.

[0021] The next step is the associating of a unique index code with an electronic business card and its specific electronic information content. Electronic business cards are created by end users using a two-phase process. The first phase is administrative and would typically be completed by a system administrator within the end user's business. This first phase involves the creation of the electronic business card template, which predefines the format and content elements available within the end users' electronic business cards. Standard formats, such as those established for "vCard" by the "Internet Mail Consortium", would be appropriate. The first phase also involves the allocation by the end user administrator of unique index codes to individual end users **103** and populating the content of certain non-editable fields within an individual end user's electronic business card, such as the person's name, company details and company position. The second phase is completed by individual end users within the end user's business using the electronic business card client apparatus. The client apparatus can incorporate the functionality to retrieve electronic business cards as well as the functionality to update the content of the electronic business card allocated to the individual end users. Once an electronic business card and an associated unique index code have been allocated to an individual end user through the electronic business card administration application, the individual end user can then update the editable fields within the electronic business card and add additional content **104** as appropriate. The individual end user's electronic business card information and its associated unique index code are stored in a central electronic business card database used by all individual end users within an end user's business. A copy of this electronic business card database is published **105** on the end user's electronic information server to enable access to the content via the network. Although the aforementioned description gives an example of the method of associating a unique index code with an electronic business card and its specific electronic information content uses an example of the end user's environment being within a specific business's environment, the same methodology could similarly be applied to other public domain environments managed by third party service providers for individual end users not associated with one another through an organizational structure.

[0022] Once an individual end user has created their electronic business card, a copy of their card is stored within their electronic business card client apparatus. The client apparatus would normally be resident on the individual end user's personal

computer that can access the electronic information network, however variant versions of the client apparatus can also be employed for use in other computing devices that may not have permanent network access. The individual end user's electronic business card can also be held in the individual end user's hand held computing device, however memory and processing capacity limitations of the hand held computing device may necessitate that the content of the individual end user's electronic business card be constrained.

**[0023]** Figure 1C shows how electronic business cards can be distributed in a variety of ways 3, including but not limited to directly from personal computer to hand held computing device, from personal computer to personal computer, from hand held computing device to hand held computing device and, as also shown in Figure 1A, indirectly through printing of the individual end user's unique index code on their hard copy business cards 108, which can then be passed physically to recipient clients 110 or passed verbally through spoken word.

**[0024]** Figure 1B shows the method for retrieving business card content associated with a unique index code. If the recipient client's personal computer or hand held computing device does not have the client apparatus installed within the personal computer or hand held computing device then the individual end user can just pass the unique index code to the recipient client's personal computer or hand held computing device and the recipient client can install the client apparatus within their personal computer or hand held computing device at a later time 111 and then use the unique index code to retrieve the full content of the individual end user's electronic business card using the client apparatus. Similarly, if the recipient client has received a constrained content version of the individual end user's electronic business card on the recipient client's hand held computing device, then the full content of the end user's electronic business card can be obtained by using the unique index code to retrieve the full content of the individual end user's electronic business card using the client apparatus on a personal computer or hand held device that has connection to the electronic information network and the memory and processing capacity to deal with the full content of the individual end user's electronic business card.

**[0025]** The client apparatus can be employed by a recipient client to retrieve an individual end user's electronic business card information. If a recipient client has not received the full content of the individual end user's electronic business card for reasons such as the individual end user only provided the recipient client with a business card with the individual end user's unique index code printed on it or the recipient client was not

able to receive the full content of the individual end user's electronic business card because of memory or processing constraints of the recipient client's hand held computing device, then the recipient client can input the individual end user's unique index code into the client apparatus 112 on a network connected personal computer or network connected hand held computing device that is not constrained by memory or processing capacity to facilitate retrieval of the full content of the individual end user's electronic business card via the electronic information network. This is achieved by the client apparatus first connecting via the electronic information network with the central index code generation and management electronic information server and submitting the individual end user's unique index code to the central index code management system for processing. The central index code management system will then check the submitted unique index code against the central index code management system database 113. If the submitted unique index code is not contained within the central index code management system database, then an error message will be returned to the client apparatus and no further transactions will occur. If the submitted unique index code is contained within the central index code management system database, then the central index code management system will obtain from the central index code management system database the location within the electronic information network of the end user's electronic information server that is associated with the submitted unique index code. The central index code management system will then communicate with the end user's electronic information server that is associated with the submitted unique index code and retrieve the full content of the electronic business card associated with the submitted unique index code 114. The central index code management system will then forward 117 the full content of the individual end user's electronic business card to the recipient client's client apparatus 118. As an optional alternative, recipient clients with hand held devices that are constrained by memory or processing capacity can instruct the central index code management system, by way of a further piece of information sent at the time of the submission of the individual end user's unique index code, to only send a sub-set of the full content of the individual end user's electronic business card. The content of the electronic business card, whether it be the full content or a sub-set of the content, will be stored in the client apparatus database. The content of this database can then be exchanged with or accessed by other external apparatus, such as but not limited to any one or more of many electronic mail apparatuses, contact management apparatuses or personal information management



apparatuses that are commercially available from various computer software development companies.

**[0026]** It is also possible for the end users to track the distribution of an individual end user's electronic business card content. When the client apparatus submits a unique index code to the central index code management system, the client apparatus can also optionally submit additional information related to the recipient client, such as but not limited to the recipient client's unique index code associated with the recipient client's electronic business card. When the central index code management system communicates with the end user's electronic information server that is associated with the submitted unique index code to retrieve the full content of the electronic business card associated with the submitted unique index code, the central index code management system can update an activity log held within the end user's database 115 to indicate that the content of the individual end user's electronic business card has been retrieved and, optionally, to log other information, such as but not limited to, the unique index code of the recipient client initiating the request for the individual end user's electronic business card. This log can then be interrogated by the end user 128 to determine how many copies of end user's electronic business cards content have been distributed, as well as other information optionally collected about the recipient clients requesting the end user's electronic business cards.

**[0027]** Recipient clients can also use the client apparatus to check for updates to end users' electronic business card content stored on recipient clients' client apparatuses. Electronic business card content can be updated by the end users at any time. The client apparatus can periodically search for updates to electronic business cards 120. This can be achieved through the same mechanism as is used for obtaining the original content of an electronic business card, but in this case the client apparatus submits to the central index code management system both the unique index code and the version identifier of the individual end user's electronic business card that is stored within the client apparatus database 121. When the central index code management system communicates with the end user's electronic information server that is associated with the submitted unique index code to retrieve the full content of the electronic business card associated with the submitted unique index code 123, the central index code management system can first compare the version identifier of the individual end user's electronic business card and only retrieve the full content of the individual end user's electronic business card if the version identifier of the individual end user's electronic business card stored at the end

users electronic information server is higher than the version identifier currently held within the database of the requesting client apparatus 125.

**[0028]** **FIGURE 2** shows the apparatus elements and interfaces in one embodiment of the present invention. The apparatuses shown are representative of one embodiment of the present invention and are explained in detail to enable the fuller description of the present invention by way of example and not as limitations of its potential further embodiments.

**[0029]** There are three distinct transactional environments within an electronic information network that facilitate one embodiment of the present invention: the central index code management system environment, the end user environment and the client apparatus environment.

**[0030]** The central index code management system environment is comprised of several sub-elements. One sub-element of the central index code management system environment is the unique index code generation apparatus 50. This apparatus 50 uses a pre-defined algorithm to create unique index codes on demand so as to meet requests submitted by end users for unique index codes and to ensure that no two unique index codes are the same. When each unique index code is created, the unique index code generation apparatus 50 stores a record in the unique index code database 52 containing, but not limited to, a copy of the unique index code created and the location within the electronic information network of the electronic business card electronic information server 59 of the end user to whom the code is to be distributed. The unique index code distribution apparatus 51 then distributes the unique index code to the end user's electronic business card administration apparatus 55 through another sub-element of the central index code management system, the unique index code server 54, and via the end user administration server 57 within the end user environment.

**[0031]** Another sub-element of the central index code management system environment is the electronic business card retrieval apparatus 53. This apparatus accepts requests from the client apparatus's electronic business card search apparatus 63 to gather electronic business card content based on the unique index code submitted by the electronic business card search apparatus 63. Upon receipt of such a request, the electronic business card retrieval apparatus 53 interrogates the unique index code database 52 for a matching unique index code. If no matching unique index code is found, then the electronic business card retrieval apparatus 53 sends an error message back to the requesting client apparatus's electronic business card search apparatus 63. If a matching

unique index code is found, then the electronic business card retrieval apparatus 53 also obtains from the corresponding record in the unique index code database 52 the location of the electronic business card electronic information server 59 of the end user to whom the unique index code was distributed. The electronic business card retrieval apparatus 53 then goes to that electronic business card electronic information server 59 and retrieves a copy of the end user's electronic business card associated with the submitted unique index code from the published electronic business card datastore storage and log file 58 and increments by one the count of distributed copies of the electronic business card in the log file associated with that end user's electronic business card in the published electronic business card datastore and log file 58 and also appends to the same log file any additional optional data related to the recipient client requesting the retrieval of the end user's electronic business card. Finally, the electronic business card retrieval apparatus 53 then forwards either the full or partial content of the end user's electronic business card to the client apparatus's electronic business card search apparatus 63, depending on the option for content detail requested by the electronic business card search apparatus 63. Communication between the electronic business card retrieval apparatus 3 and the client apparatus environment and the end user environment is facilitated via the central index code management system's unique index code server 54.

[0032] The end user environment is also comprised of several sub-elements. One sub-element of the end user environment is the electronic business card administration apparatus 55. This apparatus 55 is used by the end user to submit requests to the unique index code distribution apparatus 51 via the end user administration server 57 for unique index codes and to receive from the unique index code distribution apparatus 51 via the end user administration server 57 unique index codes generated for the end user. The electronic business card administration apparatus 55 is also used to create electronic business card templates, associate unique index codes with individual end user's electronic business cards and populate the content of certain non-editable fields within an individual end user's electronic business card, such as the person's name, company details and company position. Unique index codes that have been received by the electronic business card administration apparatus 55 from the unique index code distribution apparatus 51 but which have not yet been allocated to an individual end user's electronic business card are held in a file within the electronic business card database 56. When the electronic business card administration apparatus 55 associates a unique index code with an individual end user's electronic business card, a new record is written in the electronic

business card database 56 containing but not limited to the unique index code and one or more unique identifiers of the individual end user's electronic business card within the database, such as a combination of the individual end user's name and employee number. At this point the individual end user makes use of his own client apparatus environment's end user electronic business card administration apparatus 62 to update the editable fields within their electronic business card and add additional content as appropriate. These updates of the individual end user's electronic business card by the individual end user are passed to the electronic business card database 56 via the end user administration server 57 and used to update the content of the associated record in the database 56. A copy of the individual end user's electronic business card content is also stored within the client apparatus environment's electronic business card database 61. Both the electronic business card databases 56 and 61 in the end user and client apparatus environments also record a version identifier in association with each electronic business card such that if any electronic business card in the electronic business card data bases is updated, the version identifier associated with the respective electronic business card is also incremented. Once the individual end users have updated their respective electronic business cards using the aforementioned method, a copy of the content of all of the end users' electronic business cards is periodically or by direction published by the electronic business card administration apparatus 55 and placed into the published electronic business card datastore and log file 58.

[0033] The client apparatus environment is also comprised of several sub-elements. One sub-element of the client apparatus environment is the electronic business card search apparatus 63. This apparatus 63 is used to submit requests for electronic business card content to the central index code management system. A recipient client who has received a unique index code from an individual end user can input the individual end user's unique index code into the electronic business card search apparatus 63. When the electronic business card search apparatus 63 submits the unique index code to the central index code management system, it can also optionally, dependent upon input from the recipient client, send additional information about the recipient client stored within the client apparatus, including, but not limited to, the unique index code associated with the recipient client's electronic business card. The electronic business card search apparatus 63 also manages electronic information received from the central index code management system, including, but not limited to, error messages should the submitted individual end user's unique index code not match any of the unique index codes in the unique index

code database 52 and the content of the electronic business card associated with the individual end user's unique index code submitted to the central index code management system.

[0034] Another sub-element of the client apparatus environment is the electronic business card management apparatus 60. This apparatus 60 facilitates the management of electronic business card content. When electronic business card content is received from either the end user electronic business card administration apparatus 62 or the electronic business card search apparatus 63 the electronic business card management apparatus 60 either adds the content as a new record in the client apparatus environment's electronic business card database 61 if the content is associated with a unique index code that is not already listed within the database 61, or it updates the content of an existing record in the electronic business card database 61 if the content is associated with a unique index code that is already listed within the database 61 and the version identifier within the content of the received electronic business card is higher than the version identifier of the matching electronic business card within the database 61, or it discards the content of the received electronic business card if the content is associated with a unique index code that is already listed within the database 61 and the version identifier within the content of the received electronic business card is equal to or less than the version identifier of the matching electronic business card within the database 61. The electronic business card management apparatus 60 can also be configured through input from the recipient client to periodically or on demand check for updated versions of the content of all or some of the electronic business cards currently stored in the recipient client's electronic business card database 61. The updating of database 61 content is achieved by the electronic business card management apparatus 60 automatically passing to the electronic business card search apparatus 63 the unique index codes and the version identifiers of their corresponding business card content. These unique index code and version identifier combinations are then submitted by the electronic business card search apparatus 63 to the central index code management system for processing and retrieval as available of updated electronic business card content, in the manner of the aforementioned methodology.

[0035] The electronic business card management apparatus 60 also facilitates the recipient client's interaction with the content stored within the electronic business card database 61, including, but not limited to, displaying, sorting, filtering, appending, annotating, amending, deleting and otherwise dealing with the content. The electronic business card management apparatus 60 also facilitates the exchange of or access to data

in the electronic business card database **61** with or by other external apparatus that are external to the client apparatus environment, such as, but not limited to, any one or more of many electronic mail apparatuses **64**, contact management apparatuses or personal information management apparatuses that are commercially available from various computer software development companies.

**[0036]** **FIGURE 3A, FIGURE 3B, and FIGURE 3C** show a further methodology according to one embodiment of the present invention. The methodology represented is for the purpose of passing product information from an end user to various recipient clients with the intention that by only passing the unique index code associated to the end user's product the recipient clients can later, through the use of the client apparatus, access an electronic version of the product information. This example is one embodiment of the present invention and is explained in detail to enable the fuller description of the present invention by way of example and not limitation of its potential further embodiments.

**[0037]** The methodology for employing the present invention for the purpose of distributing product information electronically is similar to that already described above for distributing business card information. The methodology is therefore only described in general terms, with accompanying diagrams, and only the salient differences between this methodology and the one earlier described and noted.

**[0038]** Figure 3A shows unique index codes being generated by an external apparatus and passed to the central index code management system **200** for distribution to end users **201**. The end users in this embodiment of the invention would be individuals or companies with products they wish to sell to customers. The end user would associate the unique index code with specific product lines **203** and additional information about the product, such as the product name, size, color, price and availability could also be associated to the product description **204**. This database of unique index codes with associated product descriptions could then be published in a product information datastore **206**. The unique index code can also be added to hardcopy information about the products, such as brochures and catalogues.

**[0039]** As shown in Figure 3B, the end user's customers, the recipient clients, can then use a client apparatus to obtain the product information in electronic format. This information can be shared with other systems and would facilitate the rapid integration of the product information into these systems, without the need for recipient clients to input the information themselves.

[0040] Customers can also regularly check for updates to this information, such as the product availability or pricing, as shown in Figure 3C. The methodology therefore enables recipient clients to periodically confirm the pricing and availability of similar products from multiple end users by accessing the appropriate information automatically using the client apparatus. A customer that regularly purchases large quantities of stationery from numerous suppliers, for example, could use the client apparatus to obtain up-to-the-minute pricing for a standard order of stationery from all of the customer's suppliers, then share the information with other apparatuses 219, such as supply chain management systems, to facilitate the purchasing of the products from the appropriate suppliers 220.

[0041] Thus, the method and apparatus of the present invention provides end users with the facility to pass specific indexed electronic information to recipient clients through the use of a unique index code employed by a central index code management system, an end user environment and a client apparatus environment.

[0042] Whereas many alterations and modifications of the present invention will be comprehended by a person skilled in the art after having read the foregoing description, it is to be understood that the particular embodiments shown and described by way of illustration are in no way intended to be considered limiting. Therefore, references to details of particular embodiments are not intended to limit the scope of the claims, which in themselves recite only those features regarded as essential to the invention.

[0043] Thus, a method and apparatus for distributing indexed electronic information using unique index codes has been described.

[0044] The embodiments described herein are intended to be illustrative of this invention. As will be recognized by those of ordinary skill in the art, various modifications and changes can be made to these embodiments and such variations and modifications would remain within the spirit and scope of the invention defined in the appended claims and their equivalents. Additional advantages and modifications will readily occur to those of ordinary skill in the art. Therefore, the invention in its broader aspects is not limited to the specific details and representative embodiments shown and described herein.